Business intelligence (BI)—the process of turning data into actionable information—is a critical capability in the healthcare industry. Business intelligence enables healthcare entities to measure, analyze, and improve across multiple areas of organizational performance. Most healthcare entities have a business intelligence strategy, but many struggle to get the greatest value from their clinical, operational, and financial data. They may have robust data and the tools for analytic enhancement, but without an interface that facilitates data sharing across departments and job roles, and an enterprise-wide commitment to integrating data with business process, they are in effect leaving money on the table. The most competitive organizations in healthcare today are data-driven. This paper provides insight into innovative business intelligence in healthcare and steps that an organization can take to get a better return on investment (ROI) from its data.

THE VALUE-ADD OF BUSINESS INTELLIGENCE IN HEALTHCARE
Agility and adaptability have become more critical than ever to survive in today’s healthcare environment. Every healthcare organization is searching for a competitive edge. Most have recognized that raw information, which is so prevalent in this data-intensive industry, is an internal resource with great potential. Business intelligence strategy advances the decision support process by integrating and providing insight into multiple data sources such as medical claims, member eligibility, provider demographics, pharmacy claims, and other records across the organization. With enterprise-wide access to single-source, trusted data, every area of the health organization can be more agile. Effective business intelligence can be a catalyst to improve productivity, streamline processes, and reduce costs.

DEVELOPING A STRATEGY THAT DELIVERS
Healthcare entities need several components in place in order to develop business intelligence that can drive market positioning and strategic decision-making. Clean data is a must. Solid insights can only come from data that is consistent, accurate, and complete. The process of aggregating data as the first step in a business intelligence process can highlight inconsistencies in the way data is collected, handled, and reported.

Data enhancement is a critical component as well. Business intelligence should produce complex information that can drive core strategy along business lines or business dimensions. Too often, rudimentary business intelligence is mainly a summation of raw data. In healthcare, the quantity and complexity of healthcare data necessitate the use of advanced analytical tools and reporting to reveal underlying trends and correlations within the raw data. Examples of these tools include service groupers, risk score assignment, predictive modeling, disease classifications, payment bundlers, and code rollups.

The last two components organizations need in order to leverage their data to its full potential are an agile analytic interface and organizational commitment. When healthcare organizations fall short of their goals with business intelligence, it is often because of one or both of these two factors:

- The range of employees who can access the data via the interface is too limited
- The data is not used throughout the organization

AGILITY IN THE ANALYTIC INTERFACE
The analytic interface facilitates employees’ use of the data through various dashboards, reports, online analytical processing (OLAP) tools, and with direct database access. Employees’ needs for data vary with their departments and roles: a financial analyst and a medical manager may both use an evidence-based measures (EBM) compliance report, but for very different business purposes. Additionally, each employee approaches the analytic interface with different expectations for its use as well as different abilities to use it. Expert analysts need tools that provide ultimate flexibility to explore their data at any starting point they choose, and with few constraints on where they can go in search of trends, patterns, and meaningful conclusions. This is one of the reasons why Microsoft Excel, for example, remains a mainstay of almost any type of analysis.
The design of the analytic interface can make or break the utility of the entire business intelligence strategy. The key to its design is agility: balancing layers of reporting with a format that is accessible to technical and non-technical employees at all levels.

Consider the number of clicks each user must make to access the data through an agile analytic interface. A single click should provide access to dashboards and graphics, and immediate presentations generated by someone other than the end user. Top-level decision makers such as the CFO, CIO, and medical director typically need high-level, single-click reporting to review high-level performance trends. Multiple clicks provide access to the next layer: reporting that offers various choices for viewing the data, with analysis that is designed and prepackaged by experienced business analysts. This layer includes standard reports, drop-down lists, and more complex measures and concepts. Users of this layer are mid-level managers, the innovators and opportunity identifiers within the organization. This type of manager needs multiple-click reporting to dive into deeper detail about specific lines of service without overspending time on minute detail.

The free-form users are the expert analysts in finance, medical management, actuarial, and sales and marketing divisions. These employees work most closely with the data through OLAP tools and direct database queries to derive answers to questions posed by their managers. They are skilled in using the data for ad hoc analysis and free-form investigation. Users who already understand their organization’s data will be “unshackled” by a flexible OLAP interface, allowing them to slice into data in new and innovative ways they may never have considered. For these users, a solution that provides much of the flexibility of Excel, with the capability of aggregating and dynamically drilling into virtually limitless amounts of data, will provide the highest analytic value and return on investment.

To drive business intelligence, the interface must support multiple “data experts” within the organization. Interface designs that are convenient and user-friendly can make a positive impact on employees’ willingness to utilize a data resource. An interface that offers multiple levels of sophistication for entry points also greatly reduces the users’ learning curve, which in turn increases the value of the interface to the organization and the quantity and quality of business intelligence that can be derived through its use.

**FIGURE 2: LAYERS = INTERFACE AGILITY**

<table>
<thead>
<tr>
<th>LAYER</th>
<th>PRESENTATION OF DATA</th>
<th>USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>SINGLE-CLICK ENVIRONMENT</td>
<td>IMMEDIATE</td>
<td>CFOS, CIOS, MEDICAL DIRECTORS</td>
</tr>
<tr>
<td></td>
<td>PRESENTATIONS, DASHBOARDS, GRAPHICS</td>
<td></td>
</tr>
<tr>
<td>MULTI-CLICK</td>
<td>STANDARD REPORTS WITH DROPDOWN LISTS</td>
<td>MID-LEVEL MANAGERS</td>
</tr>
<tr>
<td>FREE-FORM</td>
<td>AD HOC ANALYSIS AND FREE-FORM INVESTIGATION</td>
<td>DATA ANALYSTS THROUGHOUT ORGANIZATION</td>
</tr>
</tbody>
</table>

**GENERATING ORGANIZATIONAL COMMITMENT**

Gaining widespread commitment to using business intelligence is one of the most significant challenges that healthcare organizations must overcome to extract the greatest value from their analytics. Too often, just a handful of employees use the analytic interface, and they are charged with accessing a vast range of dashboards and reports. In this situation, organizations only scratch the surface in terms of the decision support capabilities available to them.

When an organization decides to more fully leverage its business intelligence, the steps are similar to the implementation of any other top-down and bottom-up business improvement process. Management must align business processes and goals with the use of the analytic interface, and communicate the impact business intelligence can make on the organization’s future. Drivers of the process should strive to go beyond top-management agreement to top-management commitment. The move forward with adaptation should model use of business intelligence across functions to get managers thinking beyond their own departments’ analytical needs.

Training should be made available for everyone who could potentially use the interface to improve job performance. Management should consider a greater investment in training for the analysts in order to encourage their commitment to embracing the system. To be effective free-form users, they need to develop the skills to understand the capabilities of the interface as well as the data.

Ideally, at least one employee within each work group, department, or team should become an in-house expert with the capability to generate detailed reports applicable to their areas, including ad hoc requests for data. As they do, team members will come to understand ways in which the data applies directly to their jobs, which in turn will generate wider acceptance and use of the interface. Over time, the in-house experts will develop even greater knowledge of the data available and ways it can be used.

As organizations push access to data out and set performance expectations that require the use of business intelligence, they start to realize greater returns on their investments. With multi-layer tools and a culture that supports their use, everyone derives value from the data.

**CONCLUSION**

With a solid business intelligence strategy in place, healthcare entities have the power to adapt to industry change and stay in front of business trends. Advanced analytics are fundamental to business intelligence strategy as they enable non-linear analysis of the data and can uncover hidden trends and correlations. However, to make the most of meaningful, actionable data, organizations need:

- A user interface that offers several levels of access and reporting to accommodate the diverse needs and abilities of users throughout the organization
- More widespread commitment and employee engagement in using the data in all facets of the healthcare business
Business intelligence makes its greatest impact when employees at all levels use their organization’s data regularly to take action and improve performance.

CASE STUDY: BUSINESS INTELLIGENCE IN ACTION
One 70,000-member health plan is using business intelligence to improve efficiency and control costs. Physicians Health Plan (PHP) serves employers, their employees, and other members eligible for Medicaid in the mid-Michigan region. Since 2006, PHP has partnered with Milliman to maintain a comprehensive business intelligence system that includes data warehousing, analytical enhancements, and an adaptable, user-friendly analytical interface. In 2010, PHP took its business intelligence strategy a step further.

BUSINESS ISSUE
As part of its alignment with the Triple Aim framework for improving care, quality, and cost, PHP developed an incentive program for primary care physicians. The foundation of the data-driven program would be data analysis and reporting that could help physicians recognize gaps in care and improve their performances.

SOLUTION
Working within the MedInsight business intelligence analytic interface, Milliman and PHP teamed up to build custom reports that integrated Healthcare Effectiveness Data and Information Set (HEDIS) measures, patient-centered medical home measures, and efficiency measures. By taking the reports to the individual physician level, PHP was able to show physicians their day-to-day practices from a different perspective. The actionable data helped physicians focus on critical areas of performance and take steps to improve quality of care and cost efficiency.

The reports are generated quarterly for the incentive program and distributed at multiple levels, including individual physicians and physician groups. PHP’s senior management and finance department also use the report to monitor changes in plan efficiency and the costs of the incentive program. For PHP, expanding the use of its existing business intelligence system to support and measure this new initiative was a natural progression within the organization.

“Our management team is continually examining strategies for driving change that will improve care, quality, and cost. We’ve found that throughout the organization, the most effective strategies are those that are shaped and sustained by data.”

—Gary Gonzales, Director of Network Service

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